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PATENT & TRADEMARK OFFICE

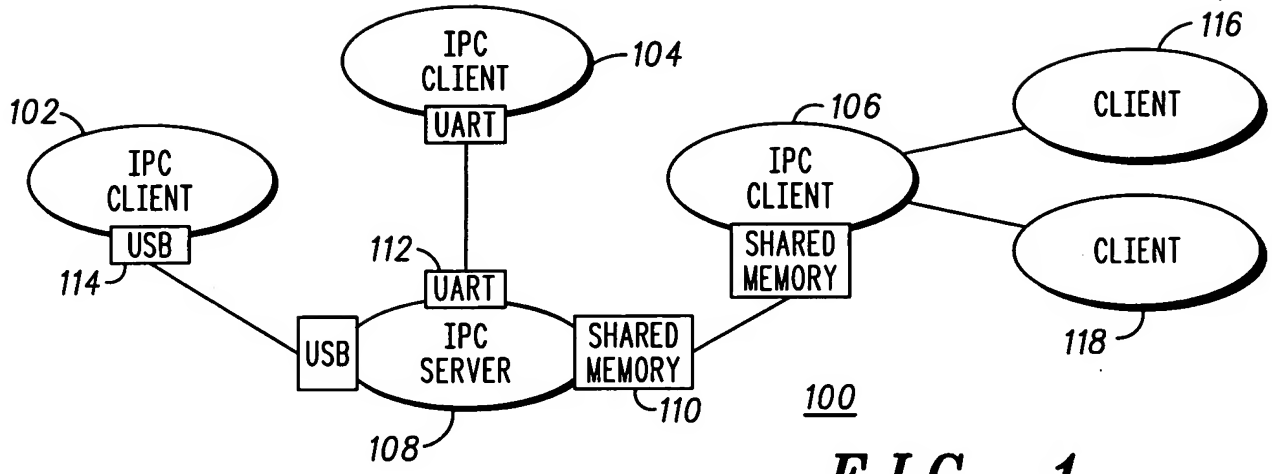


FIG. 1

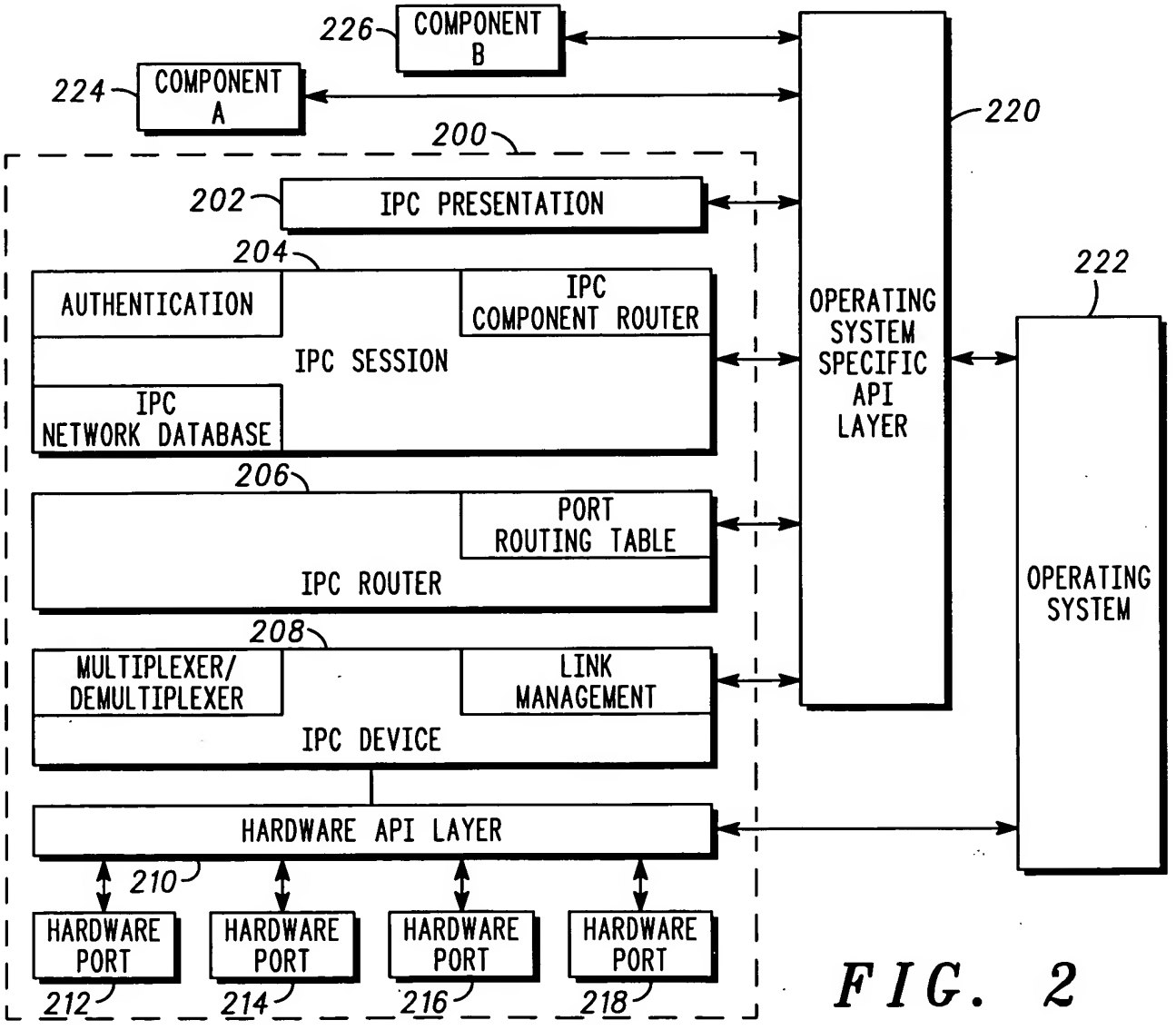
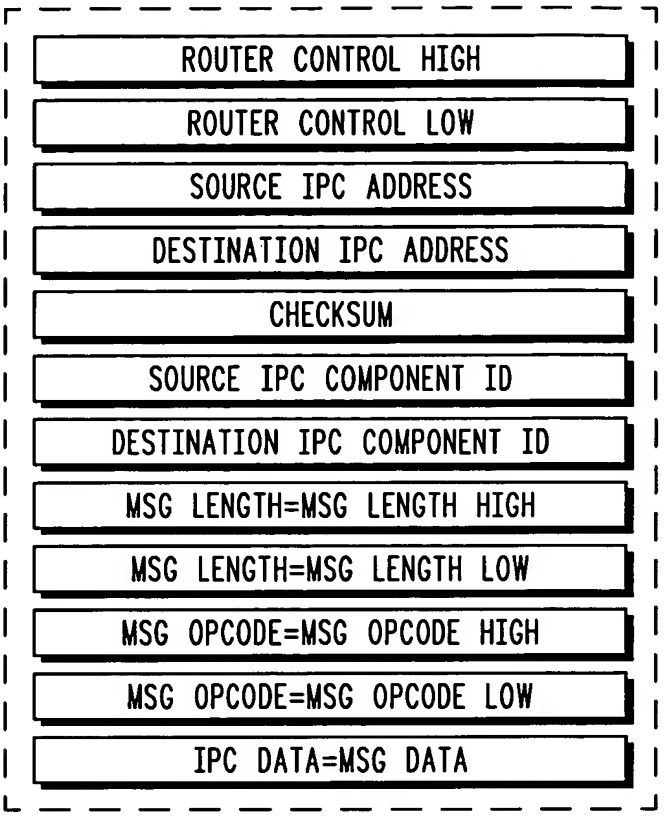


FIG. 2

FIG. 3

300



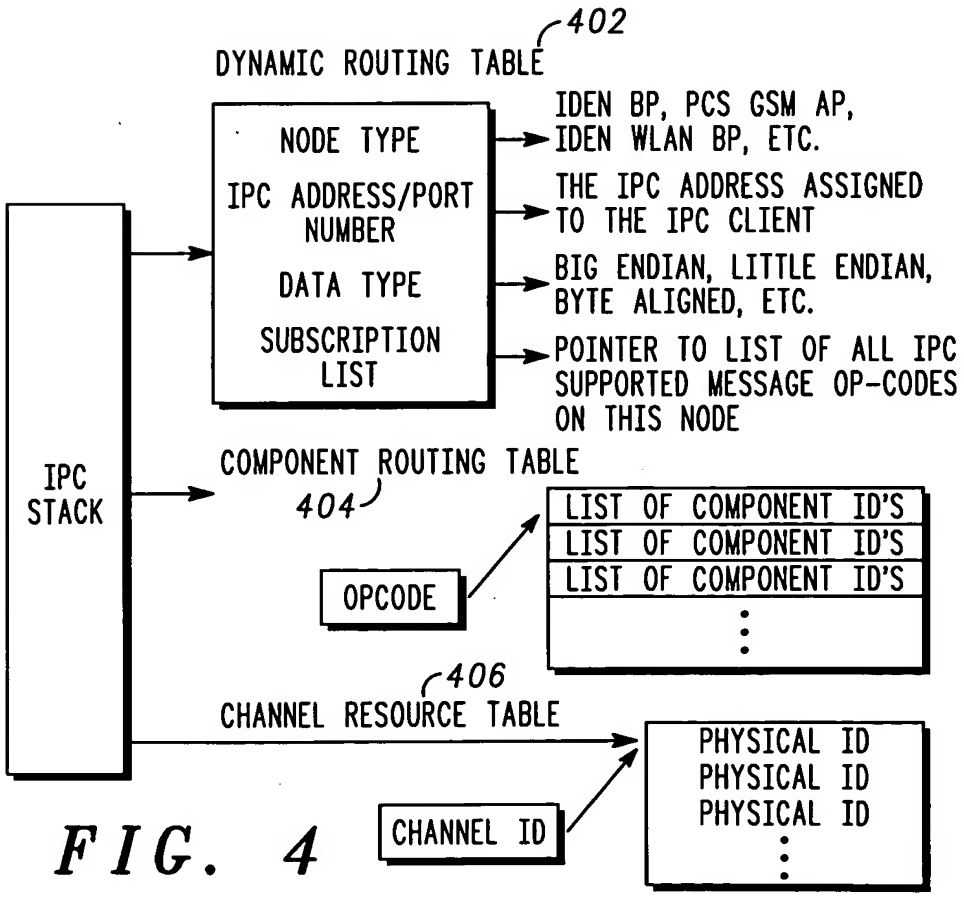


FIG. 4

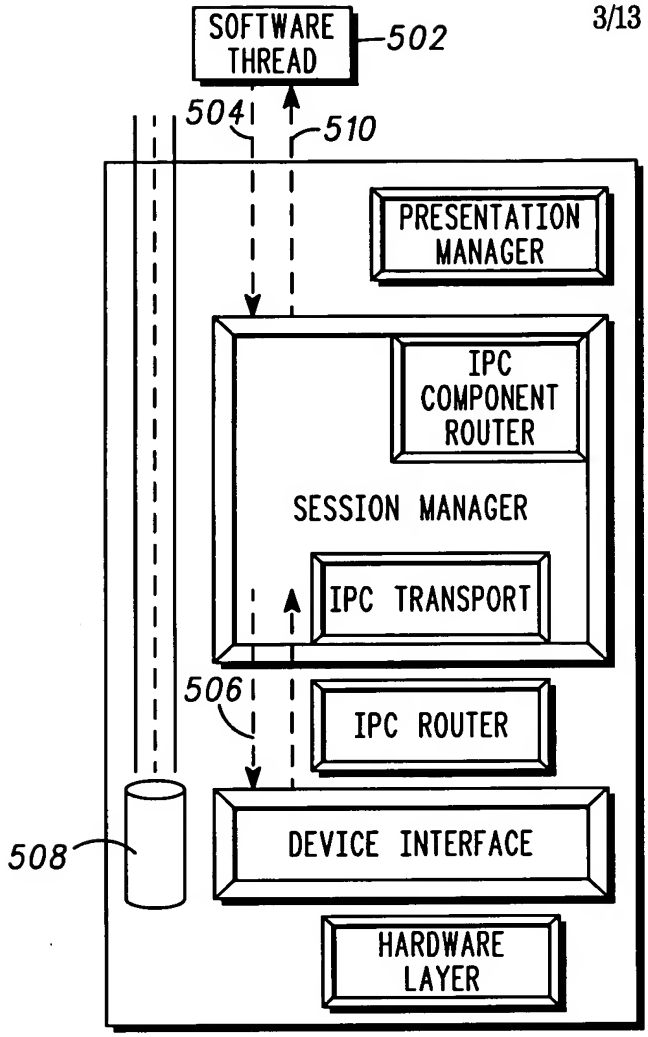

SOFTWARE THREAD
502
504
510
PRESENTATION MANAGER
IPC COMPONENT ROUTER
SESSION MANAGER
IPC TRANSPORT
506
IPC ROUTER
508
DEVICE INTERFACE
HARDWARE LAYER

FIG. 5

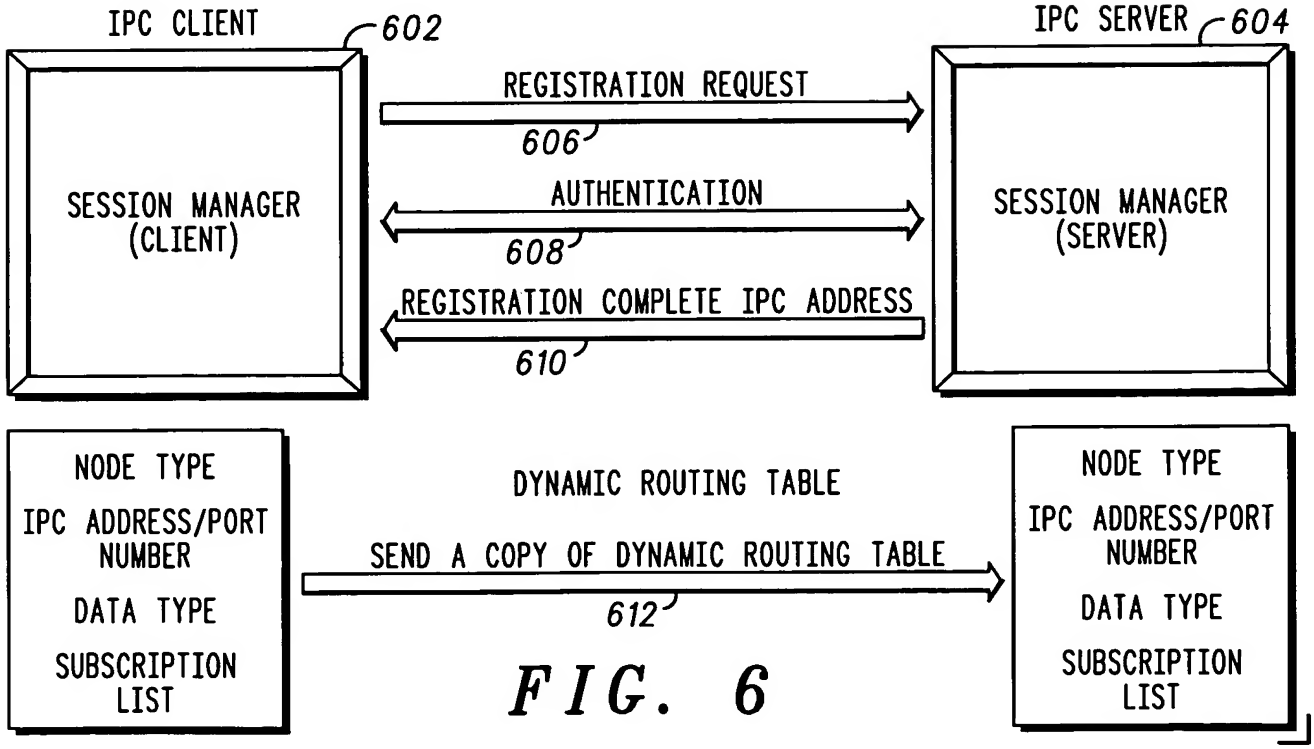

IPC CLIENT
602
IPC SERVER
604
SESSION MANAGER (CLIENT)
REGISTRATION REQUEST
606
AUTHENTICATION
608
REGISTRATION COMPLETE IPC ADDRESS
610
SESSION MANAGER (SERVER)
NODE TYPE
IPC ADDRESS/PORT NUMBER
DATA TYPE
SUBSCRIPTION LIST
DYNAMIC ROUTING TABLE
SEND A COPY OF DYNAMIC ROUTING TABLE
612
NODE TYPE
IPC ADDRESS/PORT NUMBER
DATA TYPE
SUBSCRIPTION LIST

FIG. 6

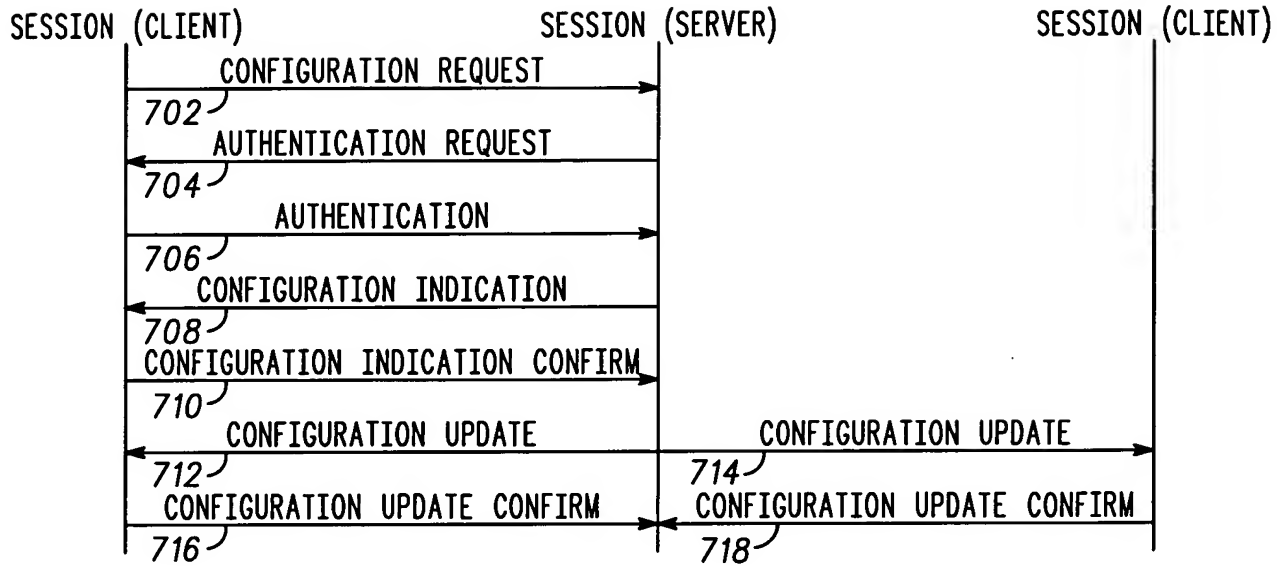

SESSION (CLIENT)
SESSION (SERVER)
SESSION (CLIENT)
CONFIGURATION REQUEST
702
AUTHENTICATION REQUEST
704
AUTHENTICATION
706
CONFIGURATION INDICATION
708
CONFIGURATION INDICATION CONFIRM
710
CONFIGURATION UPDATE
CONFIGURATION UPDATE
712
714
CONFIGURATION UPDATE CONFIRM
CONFIGURATION UPDATE CONFIRM
716
718

FIG. 7

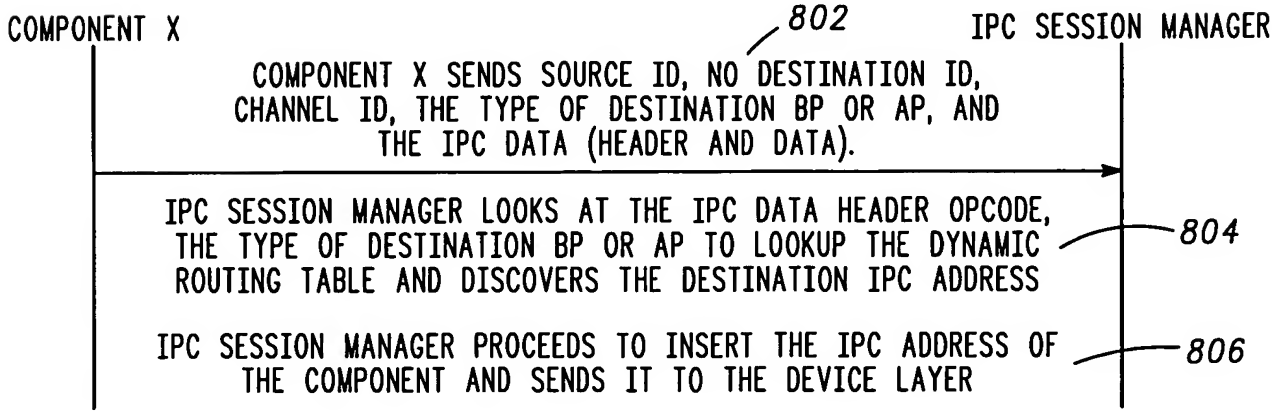

COMPONENT X
802
IPC SESSION MANAGER
COMPONENT X SENDS SOURCE ID, NO DESTINATION ID, CHANNEL ID, THE TYPE OF DESTINATION BP OR AP, AND THE IPC DATA (HEADER AND DATA).
IPC SESSION MANAGER LOOKS AT THE IPC DATA HEADER OPCODE, THE TYPE OF DESTINATION BP OR AP TO LOOKUP THE DYNAMIC ROUTING TABLE AND DISCOVERS THE DESTINATION IPC ADDRESS
804
IPC SESSION MANAGER PROCEEDS TO INSERT THE IPC ADDRESS OF THE COMPONENT AND SENDS IT TO THE DEVICE LAYER
806

FIG. 8

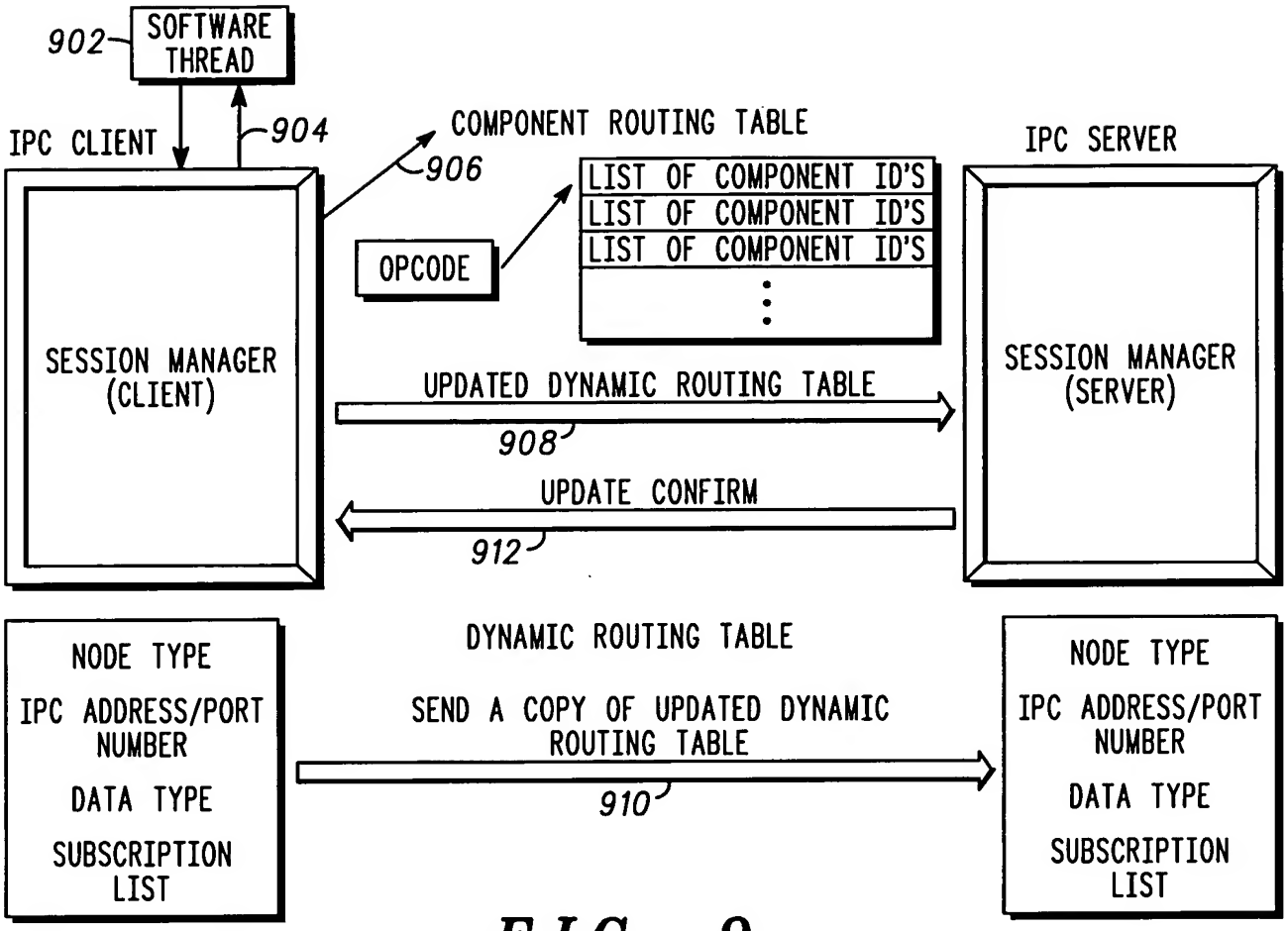

902
SOFTWARE THREAD
IPC CLIENT
904
COMPONENT ROUTING TABLE
906
LIST OF COMPONENT ID'S
LIST OF COMPONENT ID'S
LIST OF COMPONENT ID'S
OPCODE
IPC SERVER
SESSION MANAGER (CLIENT)
UPDATED DYNAMIC ROUTING TABLE
908
UPDATE CONFIRM
912
SESSION MANAGER (SERVER)
NODE TYPE
IPC ADDRESS/PORT NUMBER
DATA TYPE
SUBSCRIPTION LIST
DYNAMIC ROUTING TABLE
SEND A COPY OF UPDATED DYNAMIC ROUTING TABLE
910
NODE TYPE
IPC ADDRESS/PORT NUMBER
DATA TYPE
SUBSCRIPTION LIST

FIG. 9

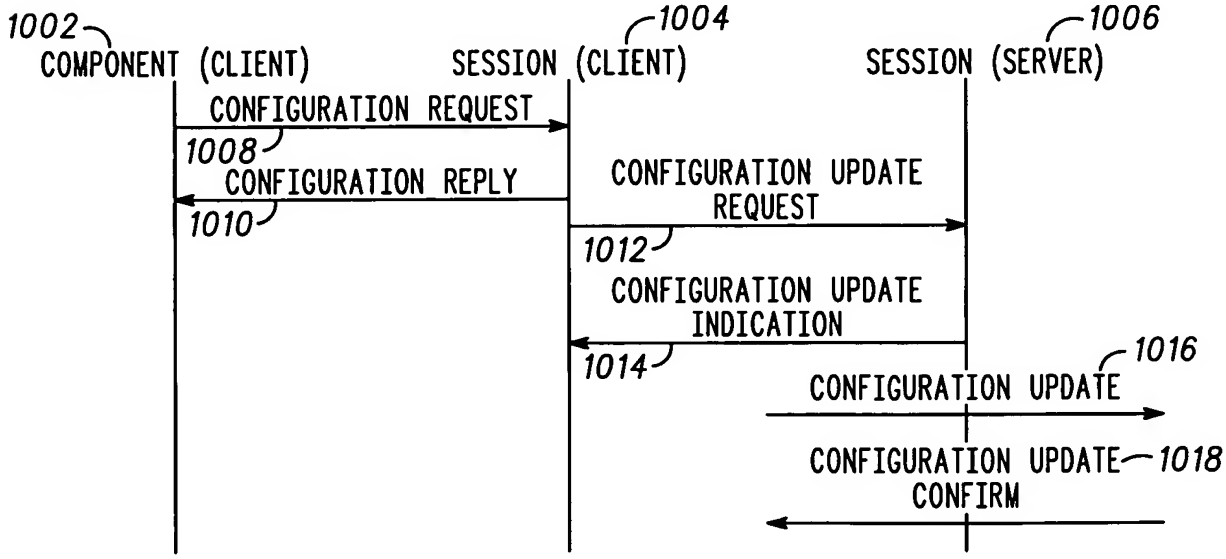

1002
COMPONENT (CLIENT)
1004
SESSION (CLIENT)
1006
SESSION (SERVER)
CONFIGURATION REQUEST
1008
CONFIGURATION REPLY
1010
CONFIGURATION UPDATE REQUEST
1012
CONFIGURATION UPDATE INDICATION
1014
1016
CONFIGURATION UPDATE
CONFIGURATION UPDATE CONFIRM
1018

FIG. 10

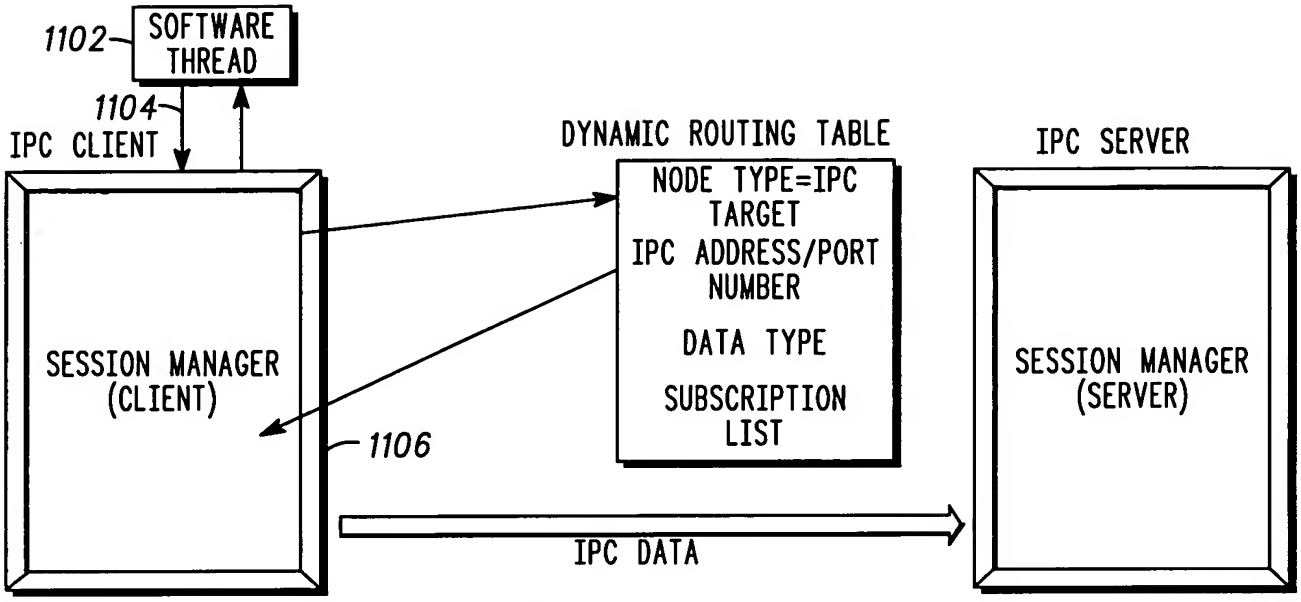

1102
SOFTWARE THREAD
1104
IPC CLIENT
SESSION MANAGER (CLIENT)
1106
DYNAMIC ROUTING TABLE
NODE TYPE=IPC TARGET
IPC ADDRESS/PORT NUMBER
DATA TYPE
SUBSCRIPTION LIST
IPC SERVER
SESSION MANAGER (SERVER)
IPC DATA

FIG. 11

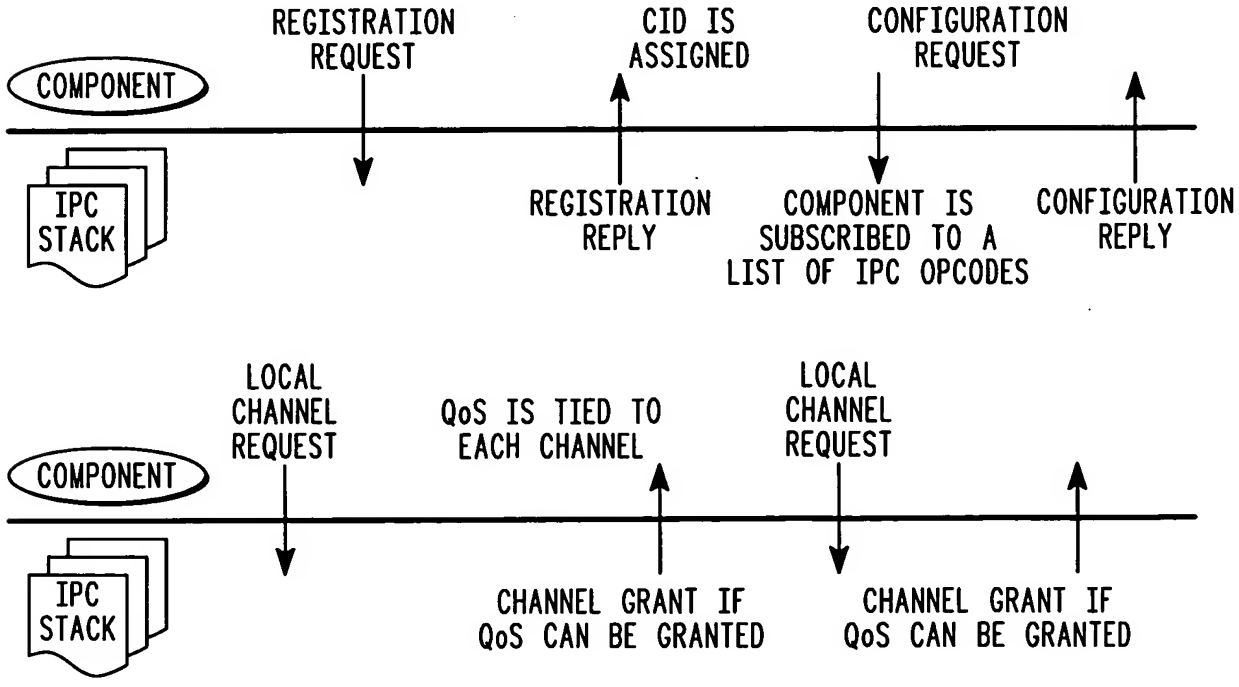

COMPONENT
IPC STACK
REGISTRATION REQUEST
CID IS ASSIGNED
CONFIGURATION REQUEST
REGISTRATION REPLY
COMPONENT IS SUBSCRIBED TO A LIST OF IPC OPCODES
CONFIGURATION REPLY
COMPONENT
IPC STACK
LOCAL CHANNEL REQUEST
QoS IS TIED TO EACH CHANNEL
LOCAL CHANNEL REQUEST
CHANNEL GRANT IF QoS CAN BE GRANTED
CHANNEL GRANT IF QoS CAN BE GRANTED

FIG. 12

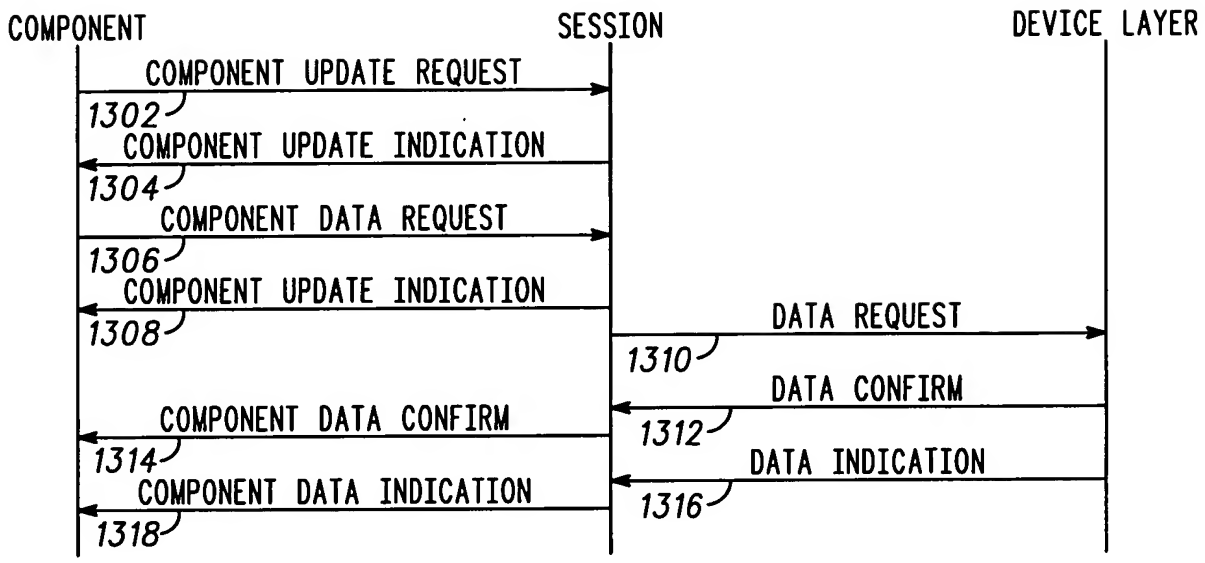


FIG. 13

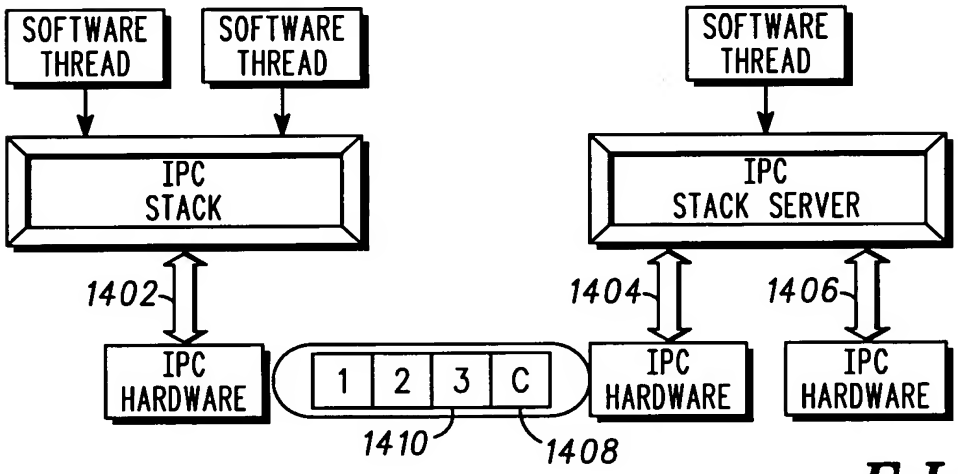


FIG. 14

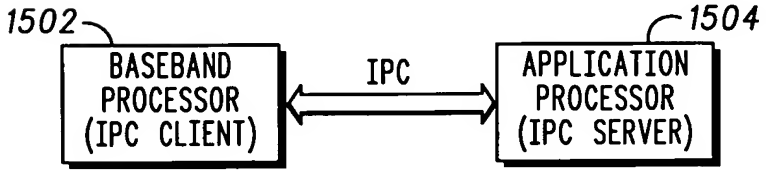


FIG. 15

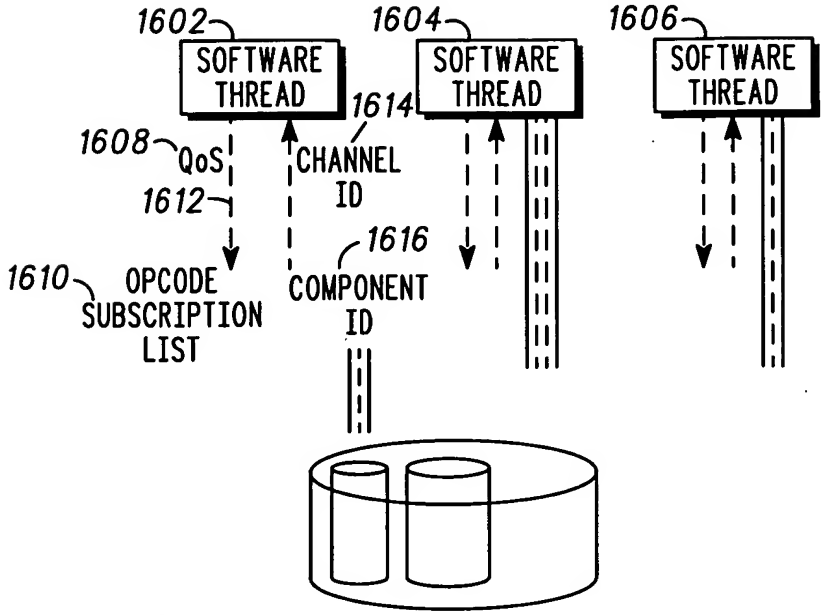


FIG. 16

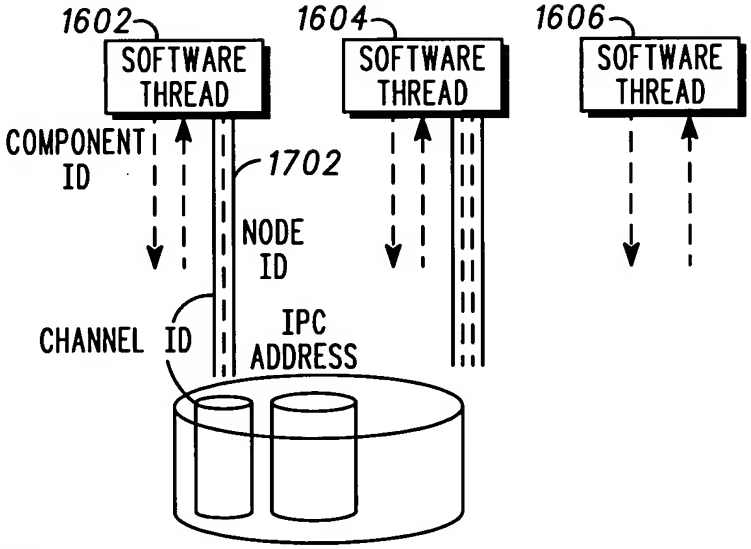


FIG. 17

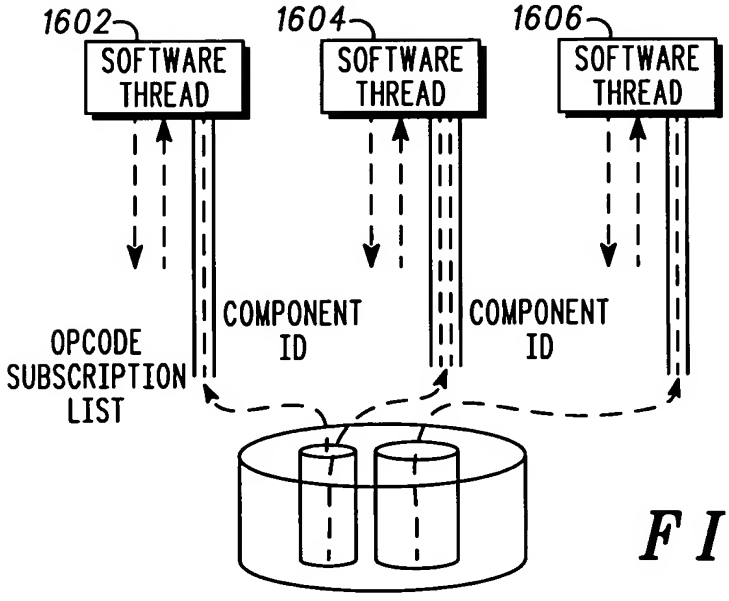


FIG. 18

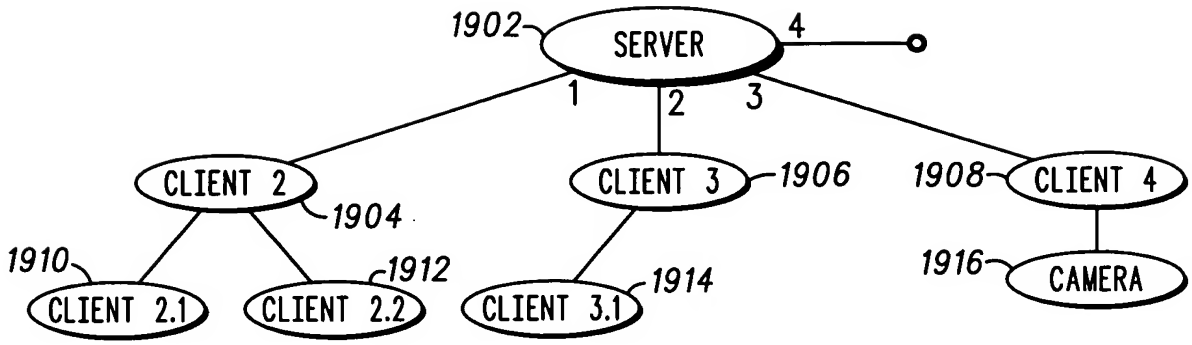


FIG. 19

PORT NUMBER	IPC ADDRESS
1	0–31
2	32–64
3	65–127
4	•
⋮	⋮

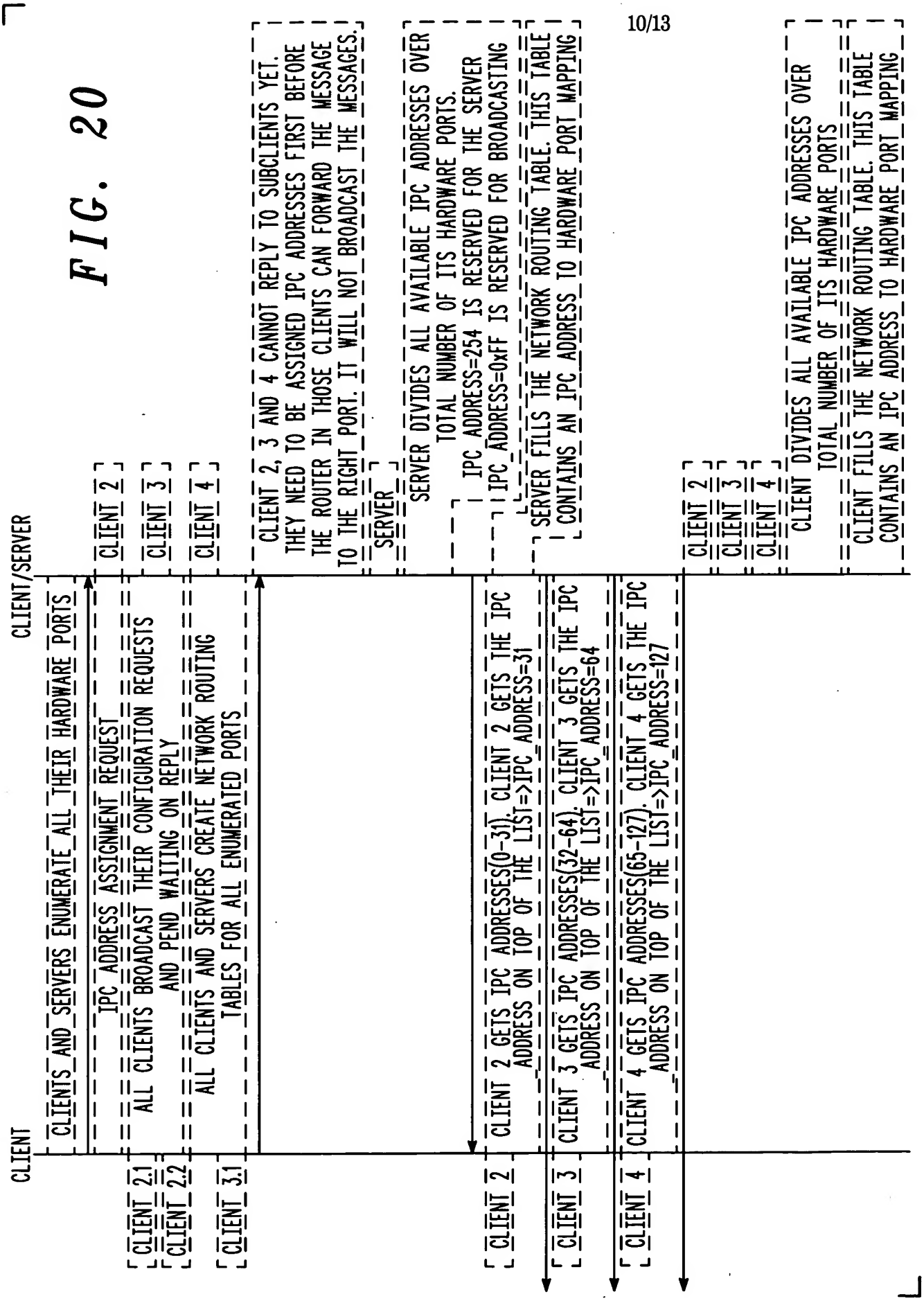
FIG. 22

PORT NUMBER	STATUS
1	DEDICATED
2	DEDICATED
3	NOT DEDICATED
⋮	⋮

2300

FIG. 23

FIG. 20


CLIENT/SERVER
CLIENT
CLIENTS AND SERVERS ENUMERATE ALL THEIR HARDWARE PORTS
IPC ADDRESS ASSIGNMENT REQUEST
ALL CLIENTS BROADCAST THEIR CONFIGURATION REQUESTS AND PEND WAITING ON REPLY
ALL CLIENTS AND SERVERS CREATE NETWORK ROUTING TABLES FOR ALL ENUMERATED PORTS
CLIENT 2
CLIENT 3
CLIENT 4
CLIENT 2, 3 AND 4 CANNOT REPLY TO SUBCLIENTS YET. THEY NEED TO BE ASSIGNED IPC ADDRESSES FIRST BEFORE THE ROUTER IN THOSE CLIENTS CAN FORWARD THE MESSAGE TO THE RIGHT PORT. IT WILL NOT BROADCAST THE MESSAGES.
SERVER
SERVER DIVIDES ALL AVAILABLE IPC ADDRESSES OVER TOTAL NUMBER OF ITS HARDWARE PORTS.
IPC ADDRESS=254 IS RESERVED FOR THE SERVER
IPC_ADDRESS=0xFF IS RESERVED FOR BROADCASTING
SERVER FILLS THE NETWORK ROUTING TABLE. THIS TABLE CONTAINS AN IPC ADDRESS TO HARDWARE PORT MAPPING
CLIENT 2
CLIENT 3
CLIENT 4
CLIENT DIVIDES ALL AVAILABLE IPC ADDRESSES OVER TOTAL NUMBER OF ITS HARDWARE PORTS
CLIENT FILLS THE NETWORK ROUTING TABLE. THIS TABLE CONTAINS AN IPC ADDRESS TO HARDWARE PORT MAPPING
CLIENT 2.1
CLIENT 2.2
CLIENT 3.1
CLIENT 2 GETS IPC ADDRESSES(0-31). CLIENT 2 GETS THE IPC ADDRESS ON TOP OF THE LIST=>IPC_ADDRESS=31
CLIENT 3 GETS IPC ADDRESSES(32-64). CLIENT 3 GETS THE IPC ADDRESS ON TOP OF THE LIST=>IPC_ADDRESS=64
CLIENT 4 GETS IPC ADDRESSES(65-127). CLIENT 4 GETS THE IPC ADDRESS ON TOP OF THE LIST=>IPC_ADDRESS=127

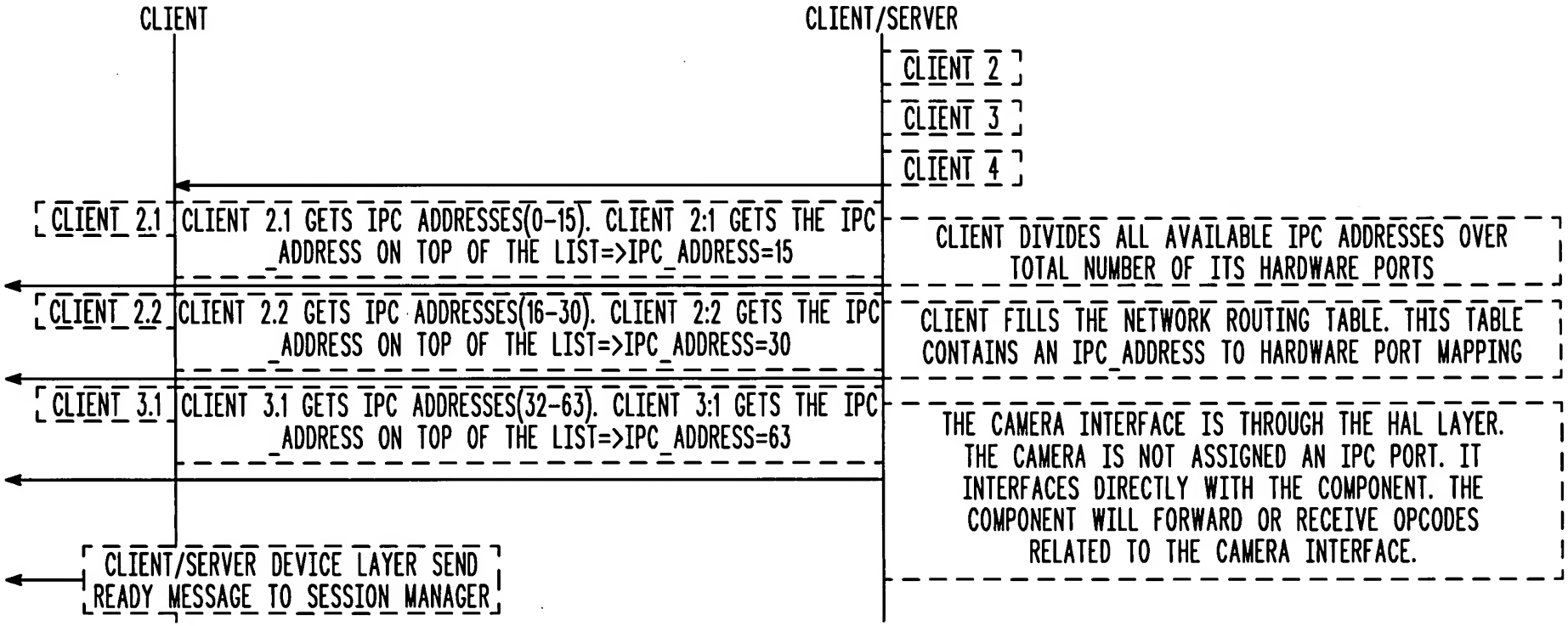

CLIENT
CLIENT/SERVER
CLIENT 2
CLIENT 3
CLIENT 4
CLIENT 2.1
CLIENT 2.1 GETS IPC ADDRESSES(0-15). CLIENT 2:1 GETS THE IPC _ADDRESS ON TOP OF THE LIST=>IPC_ADDRESS=15
CLIENT DIVIDES ALL AVAILABLE IPC ADDRESSES OVER TOTAL NUMBER OF ITS HARDWARE PORTS
CLIENT 2.2
CLIENT 2.2 GETS IPC ADDRESSES(16-30). CLIENT 2:2 GETS THE IPC _ADDRESS ON TOP OF THE LIST=>IPC_ADDRESS=30
CLIENT FILLS THE NETWORK ROUTING TABLE. THIS TABLE CONTAINS AN IPC_ADDRESS TO HARDWARE PORT MAPPING
CLIENT 3.1
CLIENT 3.1 GETS IPC ADDRESSES(32-63). CLIENT 3:1 GETS THE IPC _ADDRESS ON TOP OF THE LIST=>IPC_ADDRESS=63
THE CAMERA INTERFACE IS THROUGH THE HAL LAYER. THE CAMERA IS NOT ASSIGNED AN IPC PORT. IT INTERFACES DIRECTLY WITH THE COMPONENT. THE COMPONENT WILL FORWARD OR RECEIVE OPCODES RELATED TO THE CAMERA INTERFACE.
CLIENT/SERVER DEVICE LAYER SEND READY MESSAGE TO SESSION MANAGER

FIG. 21

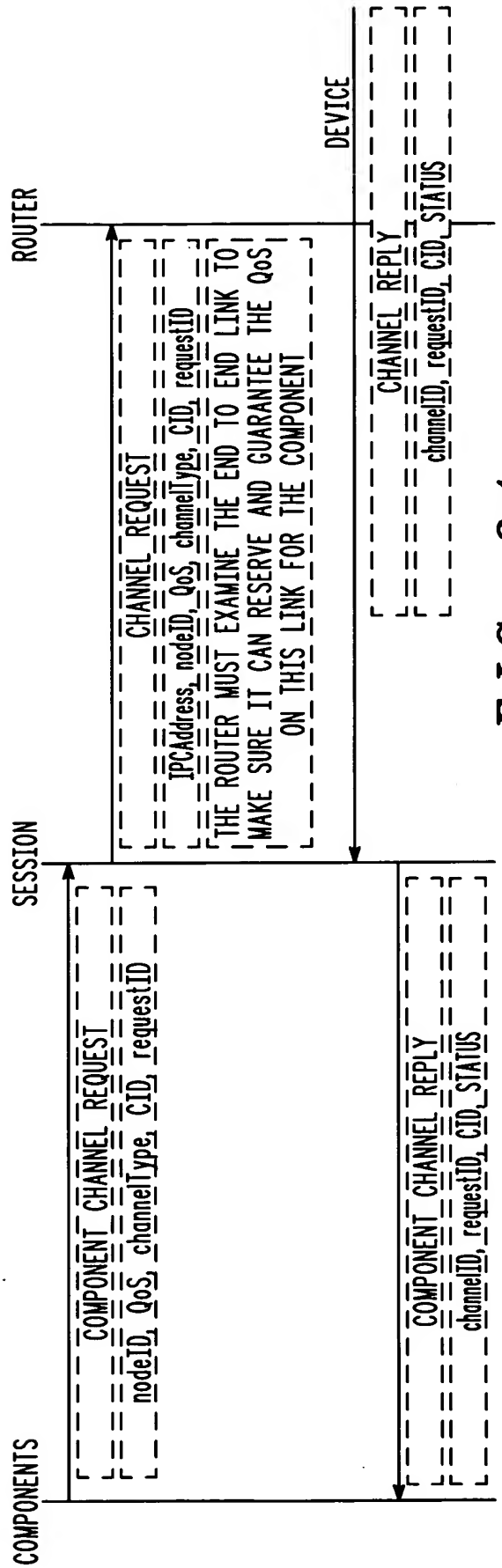

COMPONENTS
SESSION
ROUTER
DEVICE
COMPONENT CHANNEL REQUEST
nodeID, QoS, channelType, CID, requestID
CHANNEL REQUEST
IPCAddress, nodeID, QoS, channelType, CID, requestID
THE ROUTER MUST EXAMINE THE END TO END LINK TO MAKE SURE IT CAN RESERVE AND GUARANTEE THE QoS ON THIS LINK FOR THE COMPONENT
CHANNEL REPLY
channelID, requestID, CID, STATUS
COMPONENT CHANNEL REPLY
channelID, requestID, CID, STATUS

FIG. 24

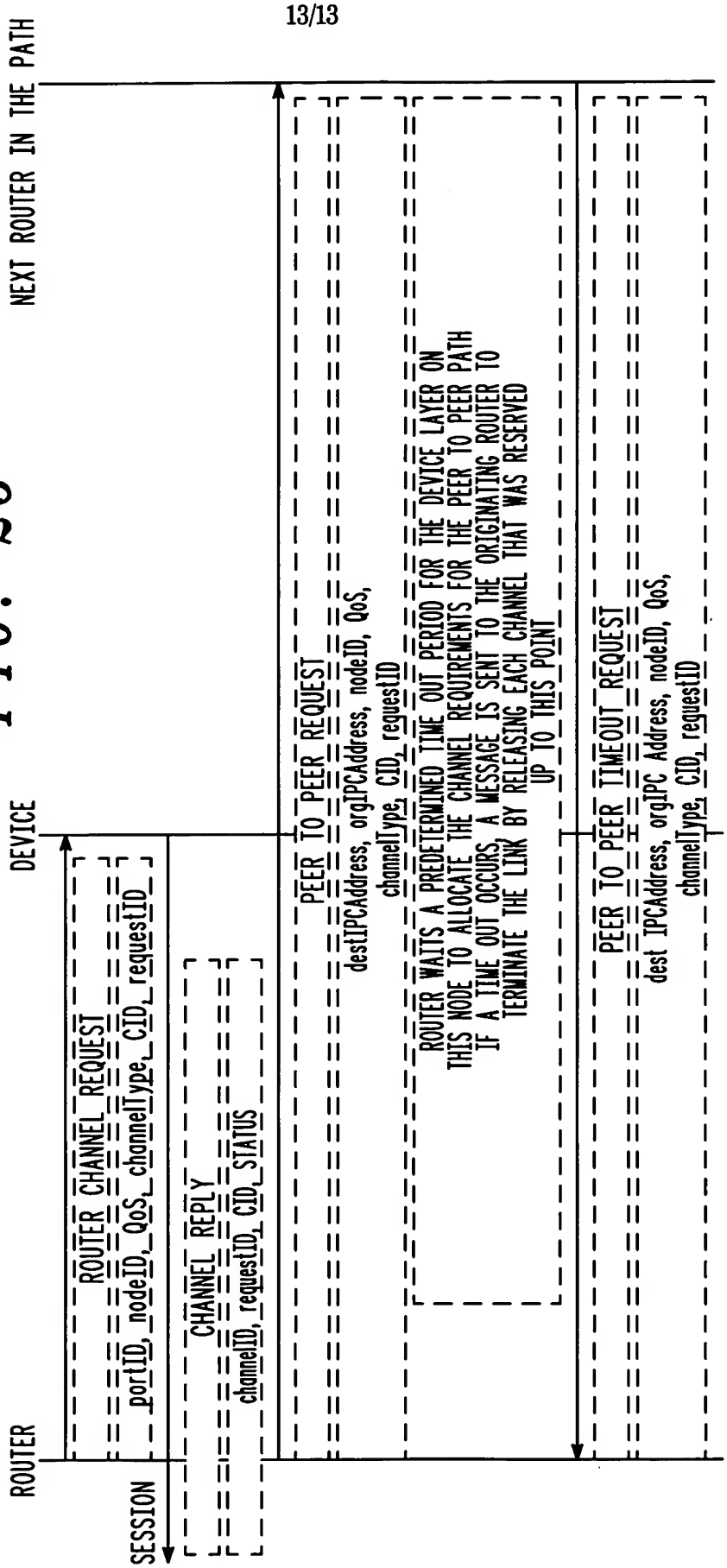

ROUTER
DEVICE
NEXT ROUTER IN THE PATH
SESSION
ROUTER CHANNEL REQUEST
portID, nodeID, QoS, channelType, CID, requestID
CHANNEL REPLY
channelID, requestID, CID, STATUS
PEER TO PEER REQUEST
destIPCAddress, orgIPCAddress, nodeID, QoS,
channelType, CID, requestID
ROUTER WAITS A PREDETERMINED TIME OUT PERIOD FOR THE DEVICE LAYER ON
THIS NODE TO ALLOCATE THE CHANNEL REQUIREMENTS FOR THE PEER TO PEER PATH
IF A TIME OUT OCCURS, A MESSAGE IS SENT TO THE ORIGINATING ROUTER TO
TERMINATE THE LINK BY RELEASING EACH CHANNEL THAT WAS RESERVED
UP TO THIS POINT
PEER TO PEER TIMEOUT REQUEST
dest IPCAddress, orgIPC Address, nodeID, QoS,
channelType, CID, requestID

FIG. 25